

# Open burning and health

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# Air Awareness

- Most people ignore air
- Air is a substance that we consume
- 1 gallon water versus 3,800 gallons air
- More toxins released into our air than land and water combined--almost twice as much

# Open Burning

- Emissions into the air without passage through a stack or vent
- Most common are household garbage and leaf and lawn waste burning



# Air at the Local Level

- Often the only time pollution is visible in many communities is during leaf and garbage burning
- Vehicles and industry emissions **combined** fail to enshroud neighborhoods in such obvious, visibly apparent smoke and haze.

# Burning: Why the Concern?

- Smoke -- particulate matter
- Hydrocarbon emissions contribute to smog formation
- Carbon monoxide
- Dioxin and other toxins, PAHs
- Asthma, heart and respiratory health
- Haze, odor, nuisance
- Pollution transport issues

# At Risk or Sensitive Groups

- Children
- Athletes, active adults
- Persons with respiratory diseases such as asthma or heart diseases
- Older citizens--may have undiagnosed heart or lung diseases.

# Air and Children

- Developing lungs and organs more susceptible to pollution
- Breathe more air per pound of body weight (1.1 m<sup>3</sup>/kg/day newborn vs. 0.3 for adult)
- More time spent outdoors, exercising and breathing larger volumes of air
- Some toxins easily absorbed into growing bones. Newborn skin more absorptive.

# Early Exposure Increases Risks Later in Life

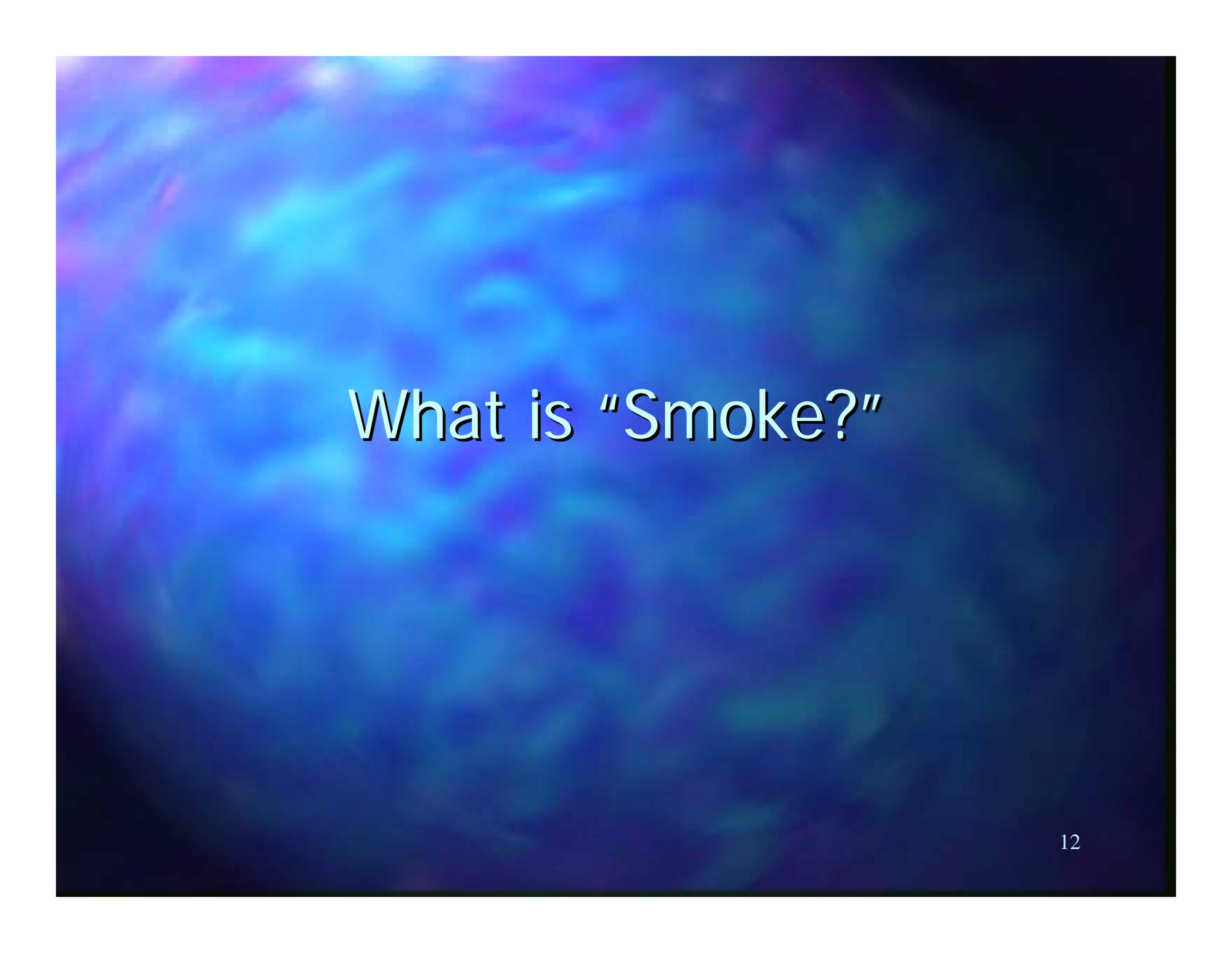
- Toxin exposure during infancy or childhood could affect development of respiratory, nervous, endocrine and immune system
- Could increase cancer risks later in life

# U.S. Asthma Epidemic

- Dramatic increase over last 10 years
- Iowa annual asthma:
  - 12,000 hospitalizations; 40,000-50,000 ER visits; 35,000-45,000 unscheduled ofc.visits
- Direct and indirect costs \$144 to \$154 million/yr, or \$759 per asthmatic.
- 200,000 Iowans with asthma
  - 50,000 under age 18
  - Caused 140,000 missed school days

# Air and Asthma

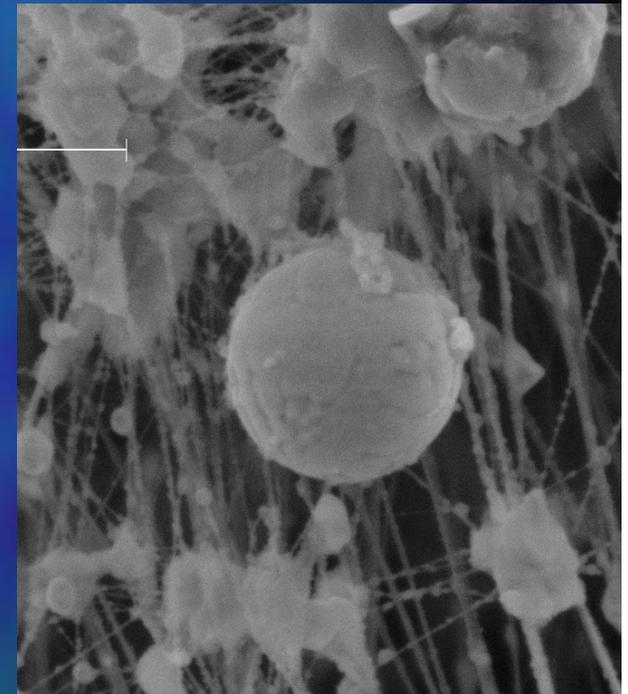
- What causes asthma is unknown. But those with the disease are more susceptible to air pollution.
- **Smoke is a known trigger to asthmatic attack.**
- Leaf and garbage burning common, avoidable triggers of attack



What is "Smoke?"

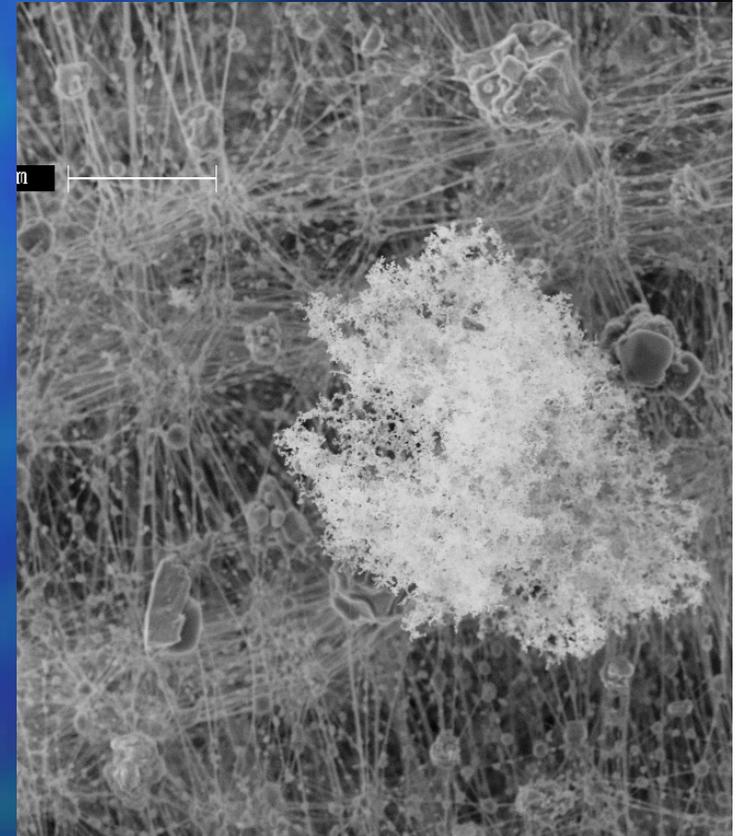
# Particulate Matter

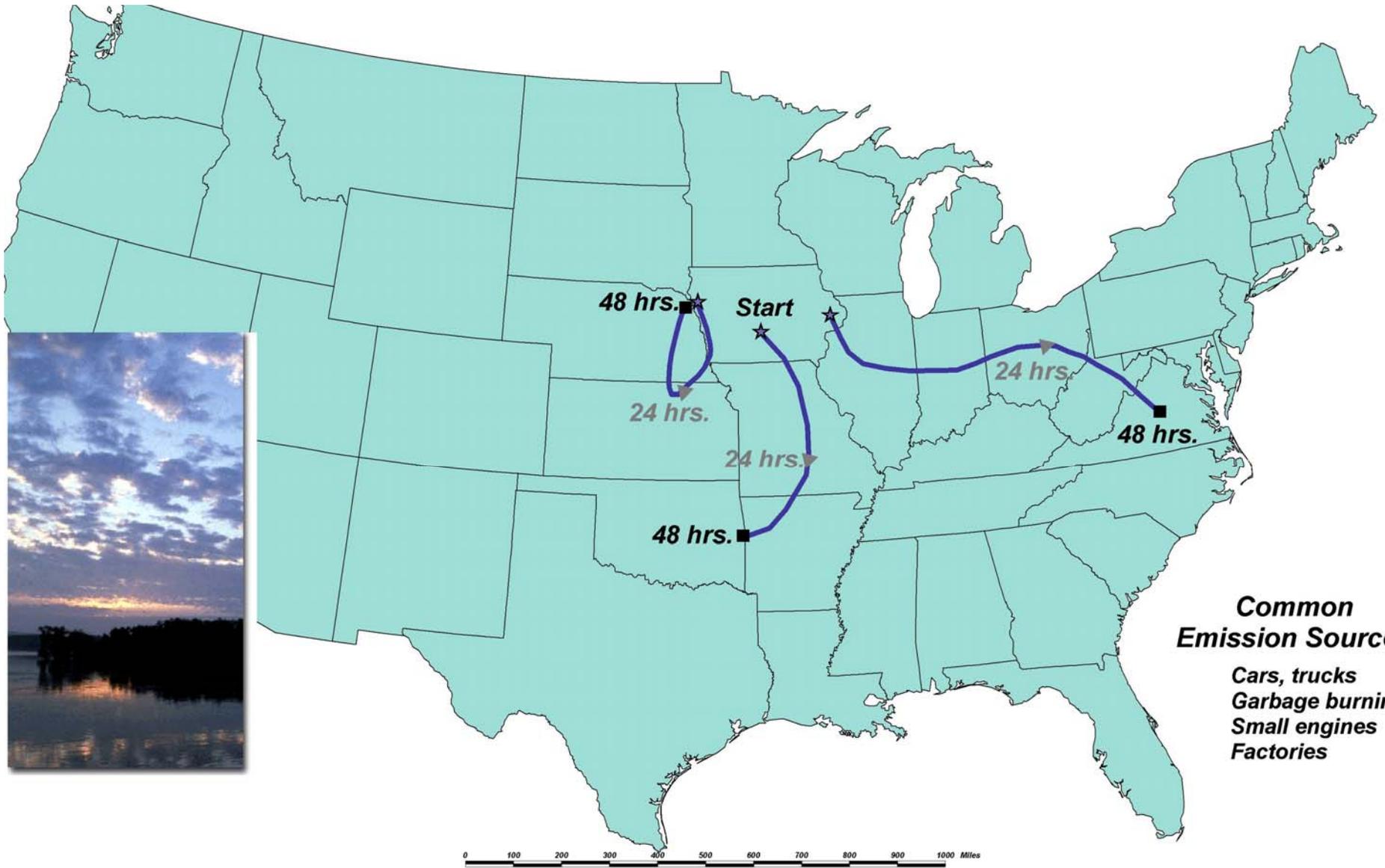
- Mixture in the air of solid and liquid droplets (aerosols)
- Microscopic sized (2.5-10 microns)
- 2.5 microns (thickness of red blood cell)
- Small particles pose greatest health risk



# Particulate Matter

- Smoke: dense concentration of individual 2.5 microns sized particles and smaller
- Scatter, remain in air 30 days to travel thousands of miles
- Haze, reduced visibility
- Diesel exhaust, burning leaves/garbage, coal use





**Common  
Emission Sources**

- Cars, trucks
- Garbage burning
- Small engines
- Factories



**Gone with the Wind**

*Emissions released at 7 am on May 25  
travel near and far in just 48 hours.*

*Where will they be in another 48 hours?  
Or 400 hours?*

# Particulate Health Effects

- Exposure increases hospitalization and emergency room visits
- Causes 15,000 premature deaths annually in United States
- Can aggravate heart & lung diseases

# Health Continued

- Coronary artery disease, congestive heart failure, chronic obstructive pulmonary disease (COPD). Diabetes may be at risk too, if they have underlying cardiovascular disease.
- Asthmatic children exposed to high particulate pollution levels much more likely to develop bronchitis.

# Particulate Exposure

- Linked to heart attack and arrhythmias in persons with heart disease.





# Leaf Burning

- Poor combustion. Poor airflow. Heavy smoke.
- Occurs in residential areas
- Smoke emitted at ground level.
- Entire neighborhoods and communities enveloped in smoke.

# Health Concerns

- Hydrocarbons--Unburned chemicals. Seven in leaf smoke known to cause cancer. Can reach deepest portion of lungs and enter bloodstream
- Des Moines had several days of Clean Air Act violations for carbon monoxide and particulate pollution due to leaf smoke
- Correlation between hospital admissions, leaf burning and monitored pollution

# Garbage Burning

- Releases many highly toxic chemicals known to cause cancers, birth defects, harm development of infants/children, behavior, reproduction
- May take many, many years to develop
- **Backyard burn barrel largest dioxin emission source**
- Lake Superior protection

# If recyclable, do not burn

- State rules do not allow residential waste to be burned if they can be locally recycled.
- By definition, not in rule.
- Many communities have citizens who burn trash despite curbside recycling option.

# Dioxins and Furans

- Forms during low-temp burns
- One barrel emits as much dioxin as a well controlled city incinerator serving ten thousand
- Persists in environment for decades, builds up in food chain. Exposure in meat and dairy products.
- Avoiding the plume not enough



# Dioxin Health Effects

- PBT-- persistent, bioaccumulative toxin
- Travels great distances. Found in high levels in breast milk of Inuit women
- Low level exposure effects in animals:
  - liver damage, endocrine disruption, decreased ability to fight bacteria and viruses. Miscarriages, reproductive damage/birth defects.

# In Sum

- Open burning an outdated, unhealthy method of disposal
- Many cleaner, safer disposal options exist.
- Personal property damage, burns, wildfires.